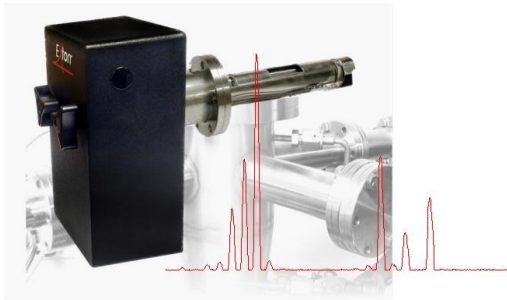


# Residual Gas Analyzers







## XT Series



### Products from **EXTorr Inc.** - Pirani, Ion Gauge, Quadrupole - All Included



The Extorr XT residual gas analyzer is a quadrupole mass spectrometer complete with a built-in Pirani gauge and Ion gauge. It is an essential measuring device which may be used in any vacuum system. The Extorr XT residual gas analyzer (RGA) models come in 100, 200 and 300 amu packages. All RGA models attach to a single 2 3/4 inch flange. Each package has automatic start-up and shut down and will constantly monitor from atmospheric pressure to ultra high vacuum. The built-in Pirani gauge and ion gauge constantly monitor total pressure and regulate and protect the RGA. These functions are seamlessly integrated into the Extorr software package.

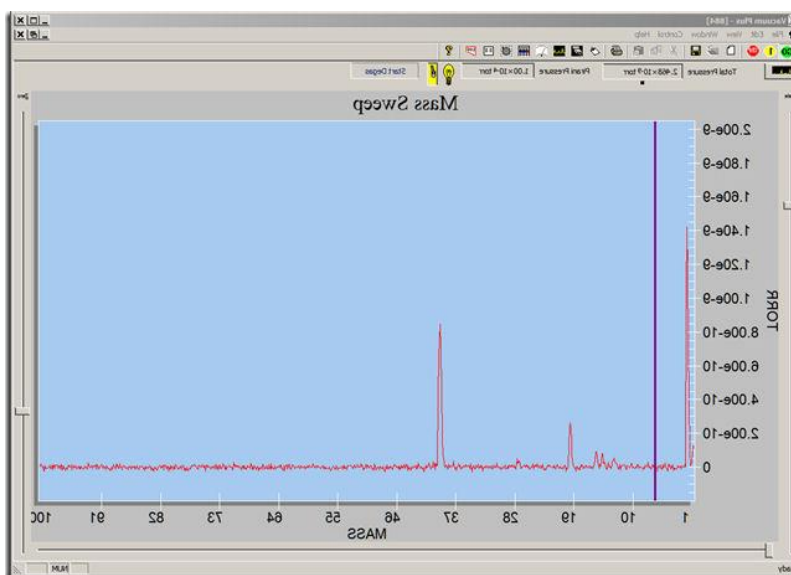
Part Number	Picture	Description
XT100		Extorr 100 AMU Residual Gas Analyzer with Vacuum Plus Software
XT100M		Extorr 100 AMU Residual Gas Analyzer with both Electron Multiplier and Faraday cup. Including Vacuum Plus Software
XT200		Extorr 200 AMU Residual Gas Analyzer with Vacuum Plus Software
XT200M		Extorr 200 AMU Residual Gas Analyzer with both Electron Multiplier and Faraday cup. Including Vacuum Plus Software
XT300		Extorr 300 AMU Residual Gas Analyzer with Vacuum Plus Software
XT300M		Extorr 300 AMU Residual Gas Analyzer with both Electron Multiplier and Faraday cup. Including Vacuum Plus Software

## Note on Extorr XT RGA:

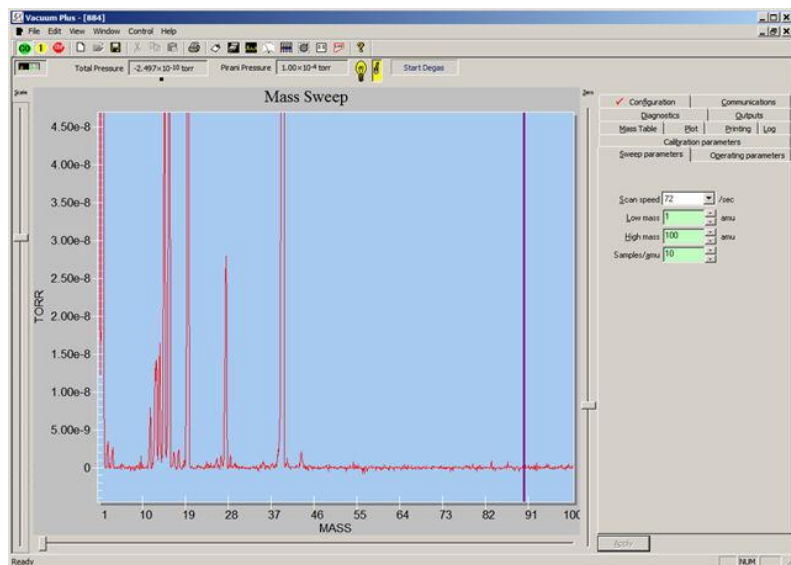
The standard XT100 gives detection limits below  $1\text{E-}11$  torr.  
 The electron multiplier does give detection limits below  $1\text{E-}13$  Torr.

If you get down into the UHV range, like  $10^{-9}$  Torr, you can still see the main constituents, for example:

Here is a RGA in a small chamber with a getter that has been baked and evacuated.  
 You can see the hydrogen and a small amount of methane at mass 2, 15, 16 from the getter.  
 At 20 and 40 you can see  $\text{Ar}^{++}$  and  $\text{Ar}^+$ , that are not pumped well by the getter.  
 This scan will take several minutes, 500 samples at 10/second.  
 You can barely see the CO peak at 28 amu, but this is an exceptionally clean system.



Here is the same scan with the electron multiplier on with a gain of 1000.  
 Now the CO (28) peak is easily visible along with He, HD, CO, CO<sub>2</sub>, H<sub>2</sub>O etc.  
 This scan only takes a few seconds.



Hint: In a clean system, there is not much above 100 amu, but if you have unknown contaminants, you may want to go to 200 or 300 amu.



## Extorr XT Series Residual Gas Analyzers

The Extorr XT systems are ideal for gas analysis, leak detection and vacuum processing applications. These reliable, easy to use RGAs are available with 100, 200, and 300 amu Mass ranges and have a partial pressure detection limit of  $5 \times 10^{-14}$  Torr with the optional electron multiplier. The included Pirani gauge allows the entire pump down process, from Atmosphere to UHV, to be monitored with a single instrument. Intelligent filament start up design keeps the filament off until the pressure is low enough for safe operation. Unlike other designs, Extorr's filament, ionizer and electron multiplier can be replaced by the user. The included VacuumPlus software package operates in Windows 2000, XP, 7, 8, or 10 and communicates with the RGA Electronics Command and Control Unit (CCU) using RS-232C or USB.

### Compact Rugged Design

A Pirani gauge, a Bayard / Alpert (B/A) Ion gauge, and a Quadrupole mass analyzer are contained on a single 2.75" Conflat® flange. The compact CCU contains all of the RGA electronics. It is powered by the included 24 VDC supply and is easily removed from the probe for high temperature bake outs.

### Long-Life Dual Filaments

Dual thoria coated iridium filaments are used for electron emission. The filaments are protected from over pressure by both the Pirani gauge and the B/A Ion gauge to ensure minimum down time. If a filament does burn out, the second filament will allow for normal operation until the filaments are replaced. Extorr offers inexpensive replacement filaments and ionizers that can be changed by the user in a matter of minutes.

### Ultra-Sensitive Detection

The XT Series RGAs feature a standard Faraday cup detection system allowing partial pressure measurements from  $10^{-4}$  Torr to  $5 \times 10^{-12}$  Torr.

With the optional electron multiplier, the partial pressure sensitivity is extended to  $5 \times 10^{-14}$  Torr.

Extorr's novel electrometer measures ion currents from  $10^{-6}$  to  $10^{-15}$  amps in a single scan. This huge dynamic range means that very large and very small signals may be measured at the same time.

## Ionizer Degas

The built in degassing function cleans the ionizer by heating its surfaces using electron bombardment. This lowers the ionizer's contribution to background chemical noise and also helps to restore reduced sensitivity caused by contamination. The VacuumPlus software has a timer that automatically ends the degas cycle after 10 minutes.

## Extorr VacuumPlus Software

All Extorr RGA systems come standard with the VacuumPlus real time Windows software package. An intuitive graphical user interface makes system setup and data logging quick and easy. The display graph can be set to linear or log format and the data can be scaled using slider bars or axis limit values. The intensity units can be set to Torr, Pascal, or Ion Current. The appearance of the graph can be customized by changing the colors of the background and plot lines and the Grid Lines may be turned on and off. For further analysis, Data Logging files can be saved for easy transfer into spread sheets or other programs. The data logging files are a CSV format that contains plain text ASCII character fields. Data may be saved in a single file or in multiple files. The multiple file mode also has several options to determine when each individual file is created and saved. Graphic images can be saved in a file or copied to the clipboard for importing directly into other windows programs.

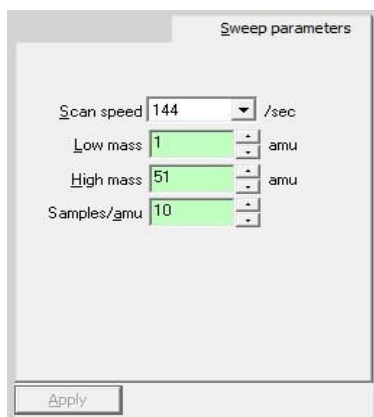
VacuumPlus allows for complete control of mass scale tuning, sensitivity calibration, ionizer setup and electron multiplier gain adjustment.

All RGA settings may be saved in a configuration file. Separate configurations can be created and saved for leak checking or other special test methods and then recalled to repeat the test in the future.

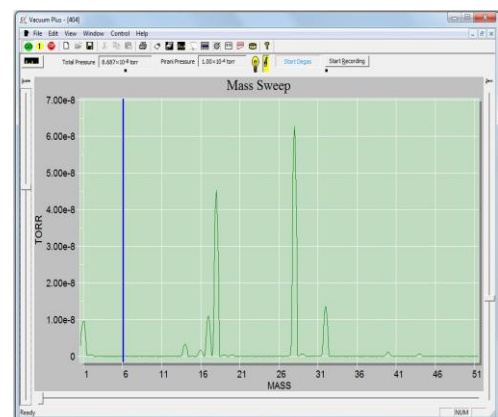
Software updates are available on the Extorr website, [www.extorr.com](http://www.extorr.com), at no cost to the user.

## Analog Sweep Mode

The fundamental mode of any RGA is the analog mass sweep. The system may be set to scan from a start mass to an end mass within the range of the RGA. The scan speed and number of data samples per amu may be changed for the application. The partial pressure versus mass data can be viewed on the graph in real time or saved to a data logging file for additional analysis.



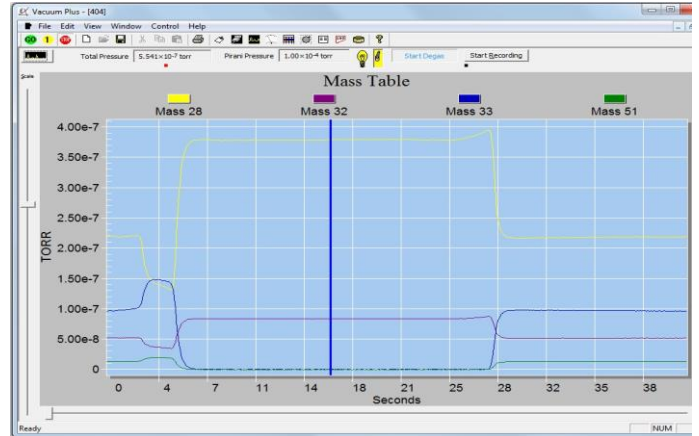
Sweep Parameters Tab



Partial Pressure vs. Mass Graph

## Trend Mode

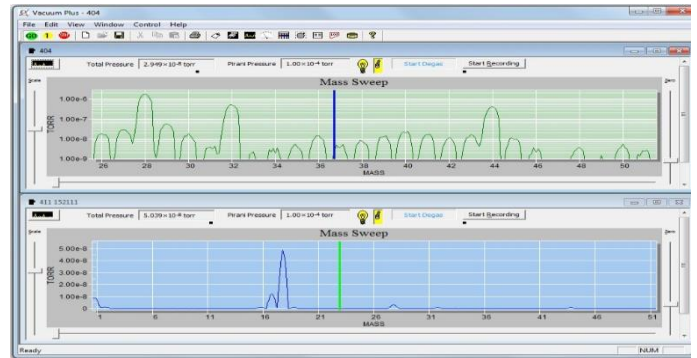
The peak intensities of up to 16 ions of interest may be followed as a function of time. A strip chart of the selected masses can be viewed on the graph or saved to a data logging file for additional analysis. Axis scaling and zoom controls are active even while data is being acquired.



Trend Mode Pressure vs. Time

## Multiple Head Operation

VacuumPlus supports multiple head operation when more than one RGA is needed. Up to 9 CCUs can be controlled in a single window.



Multiple RGA Operation

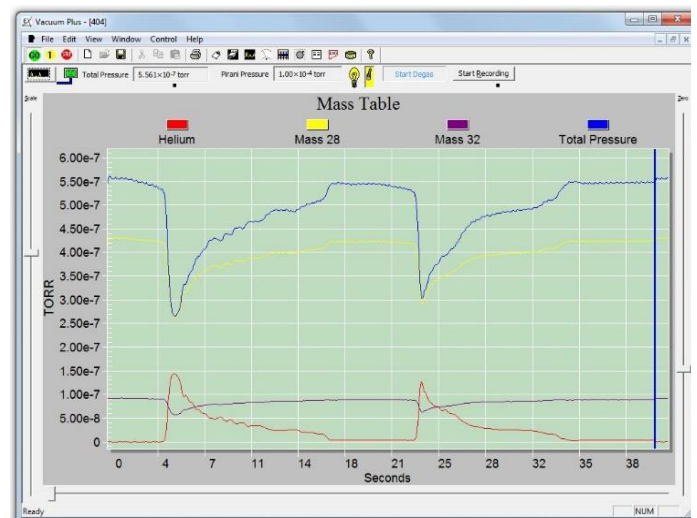
## Leak Detect Mode

In the vacuum leak detect mode, a particular gas is monitored over time. Helium is the most common leak detect gas, but any other gas may be used.

	Status	Enabled	Audio	Mass	Description	Graph Color	Dwell	High Alarm	High Warning	Low Alarm	Low Warning
1		Yes	Yes	4	Helium	Red	3.5 ms	0	0	0	0
2		Yes	No	28		Yellow	3.5 ms	0	0	0	0
3		Yes	No	32		Purple	3.5 ms	0	0	0	0
4		Yes	No	0	Total Pressure	Blue	3.5 ms	0	0	0	0

Leak Detect Mode Mass Table

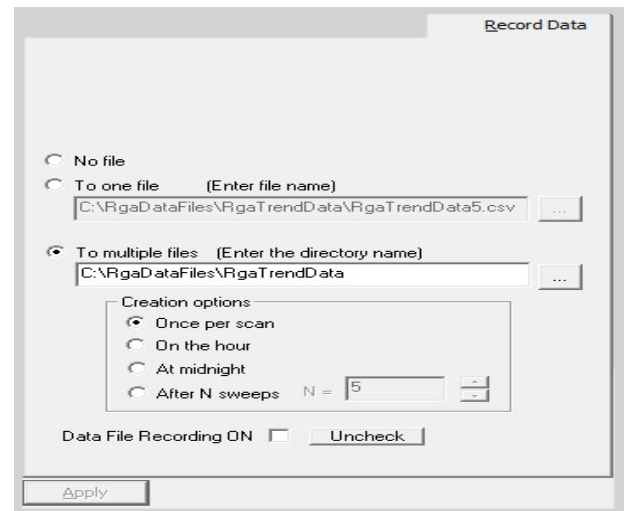
The intensity trace of the leak detection gas can be viewed in real time on the graph and an audio tone that changes pitch with the intensity may be enabled.



Leak Detect Mode showing Helium, Air and Total Pressure

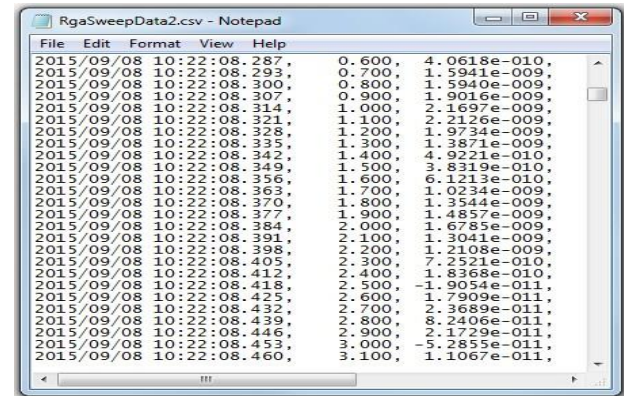
## Data Logging

Data files can be saved in a Comma Separated Values (CSV) format for easy transfer to other programs. The CSV file contains plain text ASCII character fields for the Date and Time, the Mass number, and the Intensity. Data can be saved to a single file or in multiple files. The creation options for multiple files include Once per scan, On the hour, At midnight, or After N scans.



### Record Data Tab

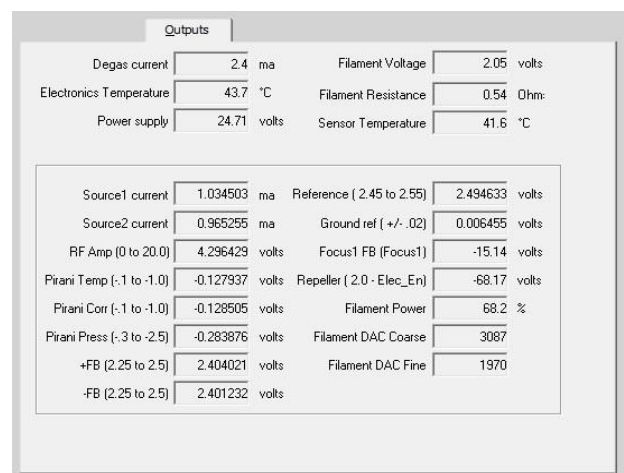
The data logging files can be saved in any local or shared network folder and the CSV files may be viewed or modified in any text editor.



### CSV File Date, Time, Mass Number, Intensity

## Diagnostic Outputs

Although the XT Series is designed for reliable operation, useful diagnostic information is available at the click of the mouse. The Outputs tab shows real-time measurements of the filament voltage, emission current, electronics temperature, and much more. This information will quickly tell you of a filament problem or shorted probe.

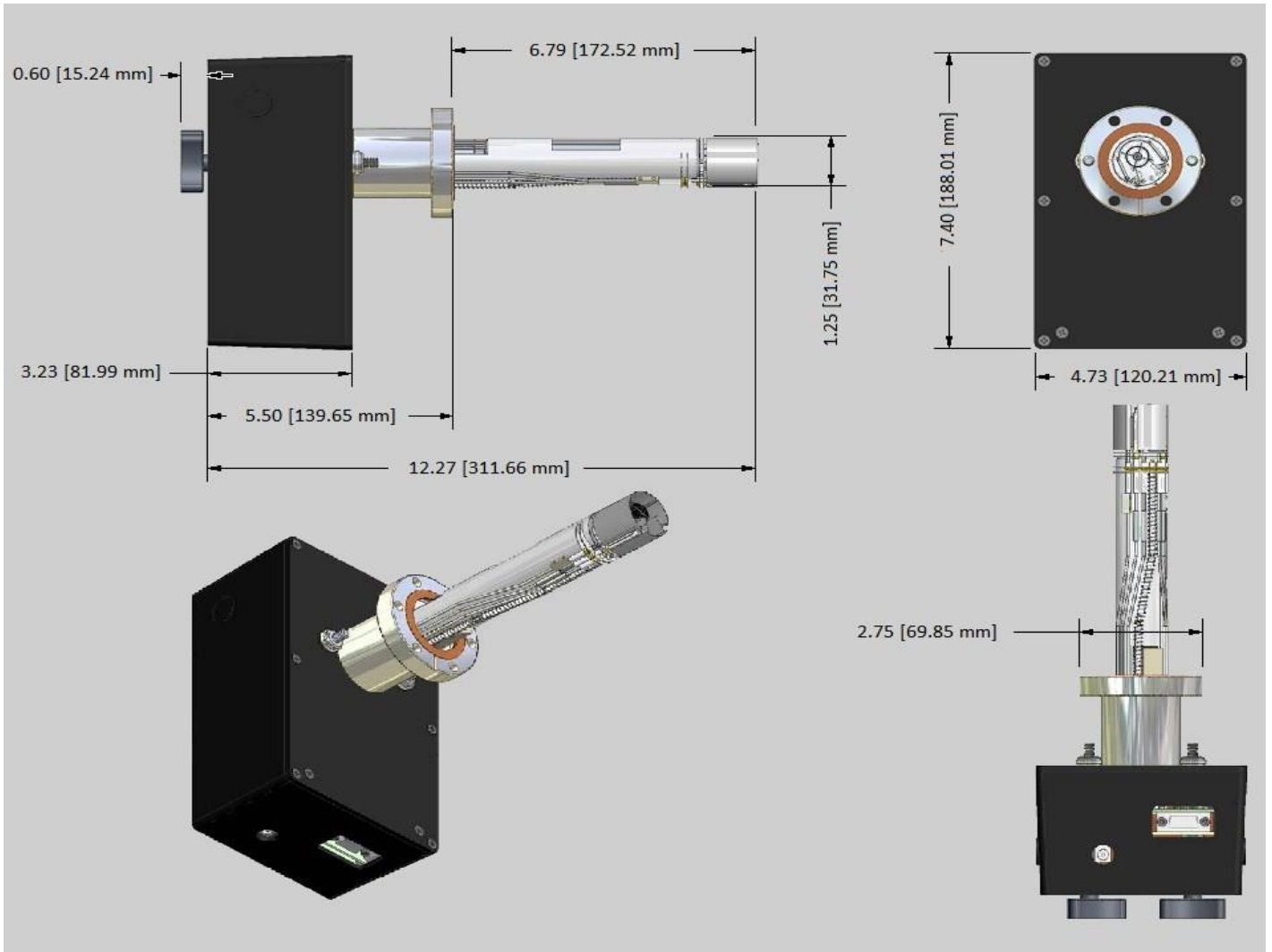


### Output Tab

## Performance and Value

The Extorr XT Series RGA it is the only vacuum gauge you will ever need. The combination of flexibility and competitive price make Extorr an outstanding vacuum measurement value.

## Dimensions



RGA Dimensional Drawing, Inches [ mm ]

## Specifications

### Mass range

XT100 1 to 100 amu Faraday cup (FC)

XT200 1 to 200 amu Faraday cup (FC)

XT300 1 to 300 amu Faraday cup (FC)

XT100M 1 to 100 amu Faraday cup (FC) and Electron Multiplier (EM)

XT200M 1 to 200 amu Faraday cup (FC) and Electron Multiplier (EM)

XT300M 1 to 300 amu Faraday cup (FC) and Electron Multiplier (EM)

### Mass filter type

Quadrupole

### Detector type

Faraday cup (FC), Standard Electron Multiplier (EM), Optional

### Resolution

Better than 0.5 amu @ 10% peak height. Adjustable to constant peak width throughout the mass range.

### Sensitivity (A/Torr)

$5 \times 10^{-4}$  into Faraday cup. Measured with N<sub>2</sub> @ 28 amu with 1 amu full peak width, 10% height, 70 eV electron energy, 6 eV ion energy and 2 mA electron emission.

### Minimum detectable partial pressure

$5 \times 10^{-12}$  Torr Faraday cup,  $5 \times 10^{-14}$  Torr Electron multiplier. Measured with N<sub>2</sub> @ 28 amu with 1 amu full peak width, 10% height, 70eV electron energy, 6 eV ion energy, and 2 mA electron emission.

### Operating range

UHV to Atmosphere  
Pirani gauge,  $10^{-3}$  Torr to ATM  
Ion Gauge below  $10^{-2}$  Torr  
RGA operation below  $10^{-4}$  Torr

### Operating temperature Bakeout temperature

50 °C Electronics,  
100 °C Probe  
300 °C (Probe only, CCU removed)

### Total Pressure Measurement

$10^{-3}$  Torr to ATM, Pirani gauge  
 $2 \times 10^{-10}$  Torr to  $10^{-2}$  Torr, B/A type Ion Gauge

### Probe Materials

SS304, Kovar, Tungsten, Alumina, Iridium, Copper, Nickel, Thoria, Platinum

### Ionizer Design

Open ion source, electron impact ionization  
Dual thoria coated iridium with firmware protection.  
Built-in 1 to 30W degas ramp-up.  
Field replaceable.

### Filament

11 to 150V, programmable  
1 to 12V, programmable  
0 to 150V, programmable

### Electron energy

### Ion energy

### Focus Voltage

### Electron emission current

0.1 to 4 mA, programmable

### Probe Dimensions

6.8" from flange face to top of ionizer

### Mounting flange

2.75" CF (CF35)

### Minimum tube I.D.

1.375"

### CCU Dimensions

3.3" x 4.8" x 7.4", Easily separated from probe for bakeout.

### CCU Extension

6.2" from flange face with mounting hardware.

### Warm-up time

Mass stability  $\pm 0.1$  amu after 30 minutes.

### PC requirement

PC running Windows 2000, XP, 7, 8, or 10 with 1024 x 768 VGA graphics, keyboard, mouse, CD ROM Drive, and 1 Unused USB or RS-232C Port.

### Computer Interface Software

RS-232C, up to 115,200 baud, or USB  
Included VacuumPlus Windows based Application. Requires Windows 2000, XP, 7, 8, or 10

### Power requirement

24 VDC @ 2.5 Amps.  
120/240 VAC adaptor included.

### Weight

5 lbs. Total, Probe and CCU.